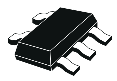
SINGLE BILATERAL SWITCH

- HIGH SPEED: t_{PD} = 4ns (TYP.) at V_{CC} = 4.5V
- LOW POWER DISSIPATION:
  I_{CC} = 1µA(MAX.) at T_A=25°C
- HIGH NOISE IMMUNITY:
  V_{NIH} = V_{NIL} = 28% V_{CC} (MIN.)
- LOW "ON" RESISTANCE:
  R_{ON} = 50Ω (TYP.) AT V_{CC} = 9V $I_{I/O}$ = 100µA
- SINE WAVE DISTORTION:
  0.042% AT V_{CC} = 4V f = 1KHz
- WIDE OPERATING RANGE:
  V_{CC} (OPR) = 2V TO 12V



SOT23-5L

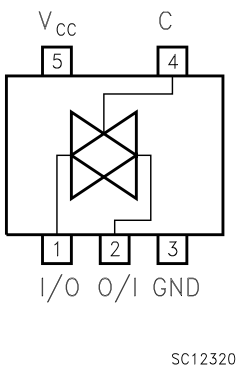
ORDER CODES

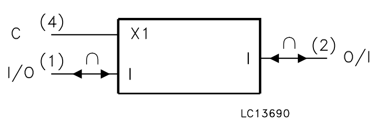
PACKAGE	T & R
SOT23-5L	74H1G66STR

DESCRIPTION

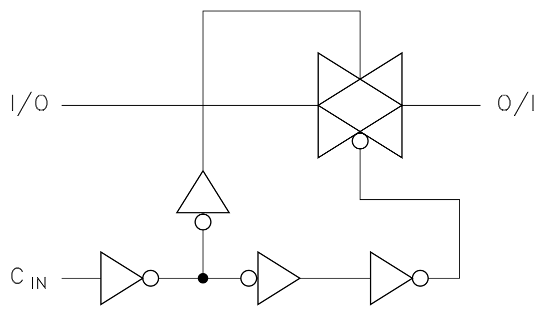
The 74H1G66 is a CMOS SINGLE BILATERAL SWITCH fabricated in silicon gate C^2MOS technology. It achieves high speed performance combined with true CMOS low power consumption.
The C input is provided to control the switch and it's compatible with standard CMOS output; the switch is ON (port I/O is connected to Port O/I) when the C input is held high and OFF (high impedance state exists between the two ports) when C is held low.
All inputs and output are equipped with protection circuits against static discharge, giving them ESD immunity and transient excess voltage.

PIN CONNECTION AND IEC LOGIC SYMBOLS





INPUT EQUIVALENT CIRCUIT



PIN DESCRIPTION

PIN No	SYMBOL	NAME AND FUNCTION
1	I/O	Independent Input/Output
2	O/I	Independent Output/Input
3	GND	Ground (0V)
4	C	Enable Input (Active HIGH)
5	V_{CC}	Positive Supply Voltage

TRUTH TABLE

C	SWITCH FUNCTION
H	ON
L	OFF *

* High Impedance State

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{CC}	Supply Voltage	-0.5 to +13.0	V
$V_{I/O}$	DC Input/Output Voltage	-0.5 to V_{CC} + 0.5	V
V_{IC}	DC Control Input Voltage	-0.5 to V_{CC} + 0.5	V
I_{IOK}	DC Input/Output Diode Current	± 20	mA
I_{IK}	DC Control Input Diode Current	± 20	mA
I_O	DC Output Source Sink Current per Output Pin	± 25	mA
I_{CC} or I_{GND}	DC V_{CC} or Ground Current	± 50	mA
P_D	Power Dissipation	500 (*)	mW
T_{stg}	Storage Temperature	-65 to +150	°C
T_L	Lead Temperature (10 sec)	300	°C

Absolute Maximum Ratings are those values beyond which damage to the device may occur. Functional operation under these conditions is not implied
(*) 500mW at 65 °C; derate to 300mW by 10mW/°C from 65°C to 85°C

RECOMMENDED OPERATING CONDITIONS

Symbol	Parameter		Value	Unit
V_{CC}	Supply Voltage		2 to 12	V
V_I	Control Input Voltage		0 to V_{CC}	V
$V_{I/O}$	Input/Output Voltage		0 to V_{CC}	V
T_{op}	Operating Temperature		-55 to 125	°C
t_r, t_f	Input Rise and Fall Time on control pin	V_{CC} = 2.0V	0 to 1000	ns
		V_{CC} = 4.5V	0 to 500	ns
		V_{CC} = 6.0V	0 to 400	ns
		V_{CC} = 10.0V	0 to 250	ns

DC SPECIFICATIONS

Symbol	Parameter	Test Condition		Value							Unit
		V_{CC} (V)		T_A = 25°C			-40 to 85°C		-55 to 125°C		
				Min.	Typ.	Max.	Min.	Max.	Min.	Max.	
V_{IH}	High Level Input Voltage	2.0		1.5			1.5		1.5		V
		4.5		3.15			3.15		3.15		
		9.0		6.3			6.3		6.3		
		12.0		8.4			8.4		8.4		
V_{IL}	Low Level Input Voltage	2.0				0.5		0.5		0.5	V
		4.5				1.35		1.35		1.35	
		9.0				2.7		2.7		2.7	
		12.0				3.6		3.6		3.6	
R_{ON}	ON Resistance	4.5	$V_{IC} = V_{IH}$ $V_{I/O} = V_{CC}$ to GND $I_{I/O} \leq 1mA$		96	170		200		250	Ω
		9.0			55	85		100		150	
		12.0			45	80		90		120	
R_{ON}	ON Resistance	4.5	$V_{IC} = V_{IH}$ $V_{I/O} = V_{CC}$ or GND $I_{I/O} \leq 1mA$		70	100		130		160	Ω
		9.0			50	75		95		115	
		12.0			45	70		90		110	
I_{OFF}	Input/Output Leakage Current (SWITCH OFF)	12.0	$V_{OS} = V_{CC}$ to GND $V_{IS} = V_{CC}$ to GND $V_{IC} = V_{IL}$			±0.1		± 1		± 2	µA
I_{IZ}	Switch Input Leakage Current (SWITCH ON, OUTPUT OPEN)	12.0	$V_{OS} = V_{CC}$ to GND $V_{IC} = V_{IH}$			±0.1		± 1		± 2	µA
I_{IN}	Control Input Leakage Current	6.0	V_{IC} = 5.5V or GND			± 0.1		± 1.0		± 1.0	µA
I_{CC}	Quiescent Supply Current	6.0	$V_I = V_{CC}$ or GND			1		10		20	µA
		9.0				4		40		80	
		12.0				8		80		160	

AC ELECTRICAL CHARACTERISTICS (C_L = 50pF, Input t_r = t_f = 6ns)

Symbol	Parameter	Test Condition		Value							Unit
		V_{CC} (V)		T_A = 25°C			-40 to 85°C		-55 to 125°C		
				Min.	Typ.	Max.	Min.	Max.	Min.	Max.	
$\Phi_{I/O}$	Phase Difference Between Input and Output	2.0			10	50		65		75	ns
		4.5			4	10		15		18	
		9.0			3	8		13		16	
		12.0			3	7		10		12	
t_{PLZ} t_{PHZ}	Output Disable Time	2.0	R_L = 500 Ω		18	100		125		150	ns
		4.5			8	20		25		30	
		9.0			6	12		22		27	
		12.0			6	12		18		25	
t_{PZL} t_{PZH}	Output Enable Time	2.0	R_L = 1 KΩ		20	115		145		175	ns
		4.5			10	23		29		35	
		9.0			8	20		25		30	
		12.0			8	18		22		27	
	Maximum Control Input Frequency	2.0	R_L = 1 KΩ C_L = 15pF V_O = 1/2V_{CC}		30						MHz
		4.5			30						
		9.0			30						
		12.0			30						

CAPACITIVE CHARACTERISTICS

Symbol	Parameter	Test Condition	Value							Unit
			T_A = 25°C			-40 to 85°C		-55 to 125°C		
			Min.	Typ.	Max.	Min.	Max.	Min.	Max.	
C_{IN}	Input Capacitance			5	10		10		10	pF
$C_{I/O}$	Switch Terminal Capacitance			10						pF
C_{IOS}	Feed through Capacitance			0.5						pF
C_{PD}	Power Dissipation Capacitance (note 1)			15						pF

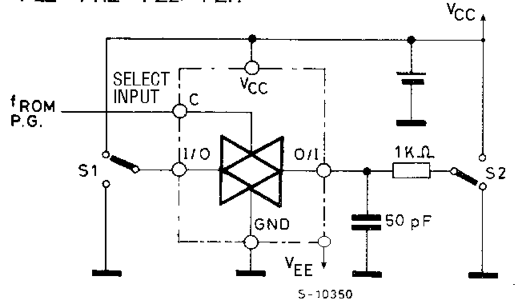
1) C_{PD} is defined as the value of the IC's internal equivalent capacitance which is calculated from the operating current consumption without load. (Refer to Test Circuit). Average operating current can be obtained by the following equation. $I_{CC(opr)} = C_{PD} \times V_{CC} \times f_{IN} + I_{CC}$

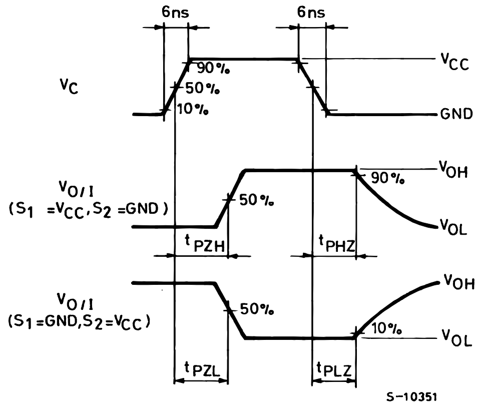
ANALOG SWITCH CHARACTERISTICS (GND = 0V; T_A = 25°C)

Symbol	Parameter	Test Condition			Value	Unit
		V_{CC} (V)	V_{IN} (V_{p-p})		Typ.	
	Sine Wave Distortion (THD)	4.5	4	f_{IN} = 1 KHz R_L = 10 KΩ, C_L = 50 pF	0.04	%
		9.0	8		0.04	
f_{MAX}	Frequency Response (Switch ON)	4.5	Adjust f_{IN} voltage to obtain 0 dBm at V_{OS}. Increase f_{IN} Frequency until dB meter reads -3dB R_L = 50Ω, C_L = 10 pF		150	MHz
		9.0			180	
	Feed through Attenuation (Switch OFF)	4.5	V_{IN} is centered at $V_{CC}/2$ Adjust f_{IN} Voltage to obtained 0dBm at V_{IS} R_L = 600Ω, C_L = 50 pF, f_{IN} = 1KHz sine wave		-60	dB
		9.0			-60	
	Crosstalk (Control Input to Signal Output)	4.5	R_L = 600Ω, C_L = 50 pF, f_{IN} = 1KHz square wave $t_r = t_f$ = 6ns		60	mV
		9.0			60	

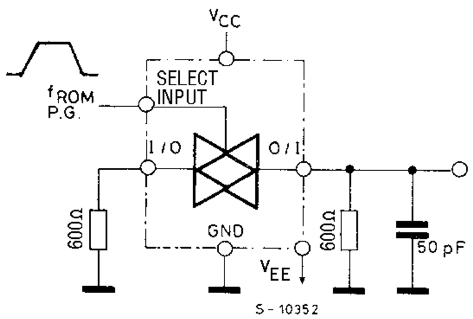
SWITCHING CARACTERISTICS TEST CIRCUIT

t_{PLZ}, t_{PHZ}, t_{PZL}, t_{PZH}

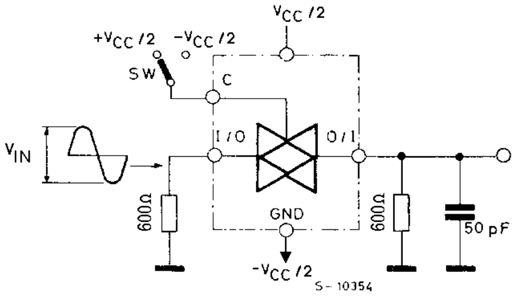




CROSSTALK (control to output

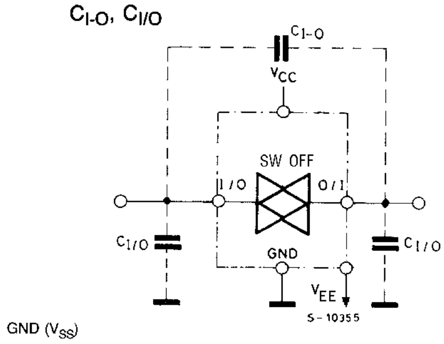


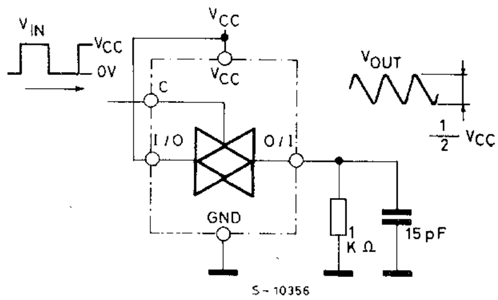
BANDWIDTH AND FEEDTHROUGH ATTENUATION



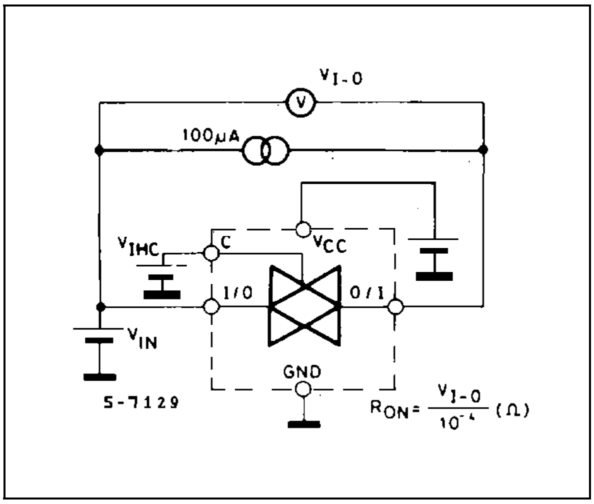
MAXIMUM CONTROL FREQUENCY

C_{I-O}, $C_{I/O}$

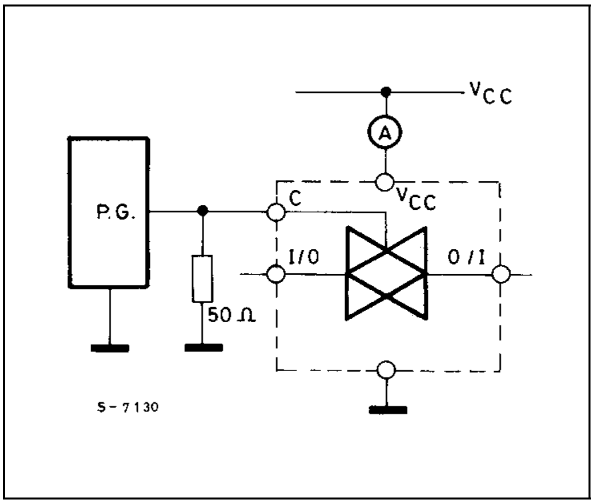




CHANNEL RESISTANCE (R_{ON})

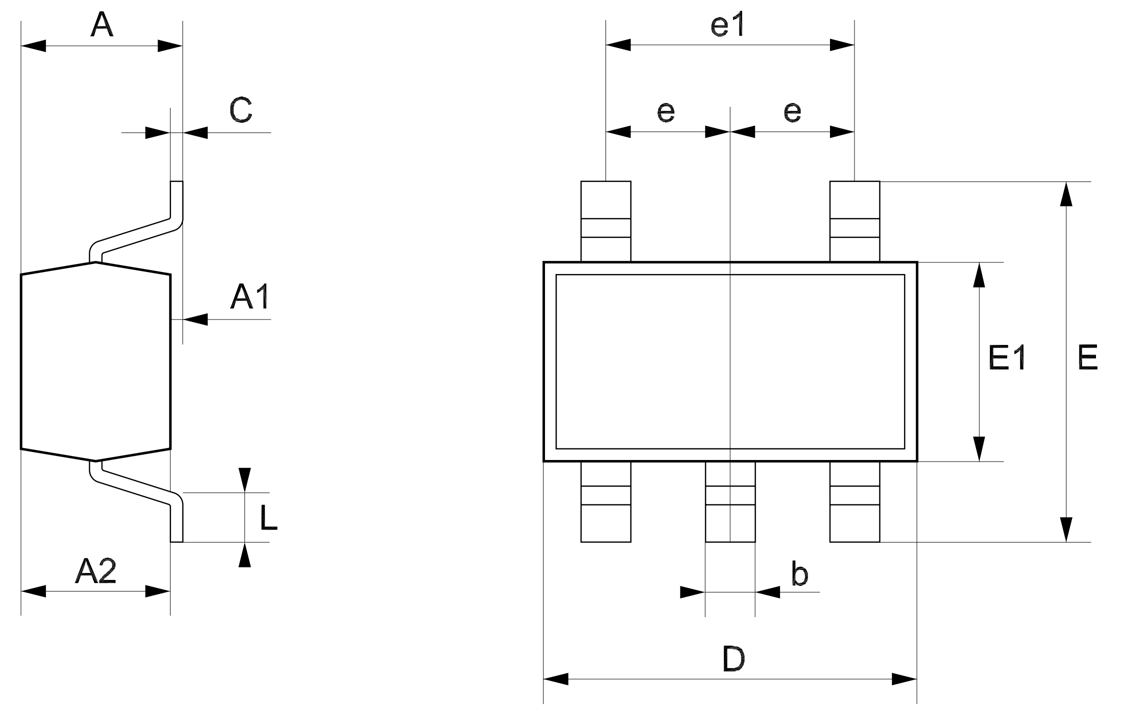


I_{CC} (Opr.)



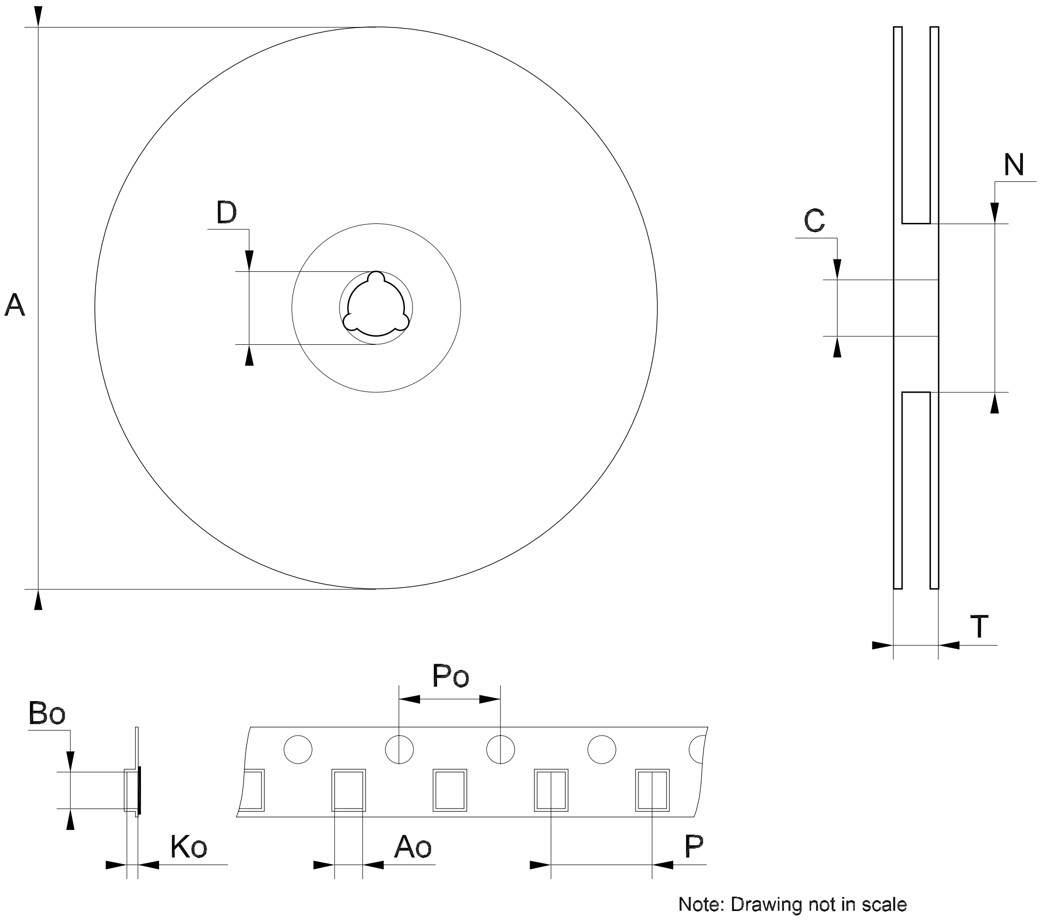
SOT23-5L MECHANICAL DATA

DIM.	mm.			mils		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A	0.90		1.45	35.4		57.1
A1	0.00		0.15	0.0		5.9
A2	0.90		1.30	35.4		51.2
b	0.35		0.50	13.7		19.7
C	0.09		0.20	3.5		7.8
D	2.80		3.00	110.2		118.1
E	2.60		3.00	102.3		118.1
E1	1.50		1.75	59.0		68.8
e		0.95			37.4	
e1		1.9			74.8	
L	0.35		0.55	13.7		21.6



Tape & Reel SOT23-xL MECHANICAL DATA

DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A			180			7.086
C	12.8	13.0	13.2	0.504	0.512	0.519
D	20.2			0.795		
N	60			2.362		
T			14.4			0.567
Ao	3.13	3.23	3.33	0.123	0.127	0.131
Bo	3.07	3.17	3.27	0.120	0.124	0.128
Ko	1.27	1.37	1.47	0.050	0.054	0.0.58
Po	3.9	4.0	4.1	0.153	0.157	0.161
P	3.9	4.0	4.1	0.153	0.157	0.161



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